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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/842,403	04/26/2001	Shinichi Ito	04329.2566	9090

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EXAMINER

ESTRADA, MICHELLE

ART UNIT

PAPER NUMBER

2823

DATE MAILED: 07/28/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/842,403

Applicant(s)

ITO ET AL.

Examiner

Michelle Estrada

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 05 May 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-23 is/are pending in the application.
- 4a) Of the above claim(s) 19 and 21 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-18, 20, 22 and 23 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 9 and 11. 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in-

(1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effect under this subsection of a national application published under section 122(b) only if the international application designating the United States was published under Article 21(2)(a) of such treaty in the English language; or

(2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that a patent shall not be deemed filed in the United States for the purposes of this subsection based on the filing of an international application filed under the treaty defined in section 351(a).

Claims 1-4, 7-14, 16, 18, 20, 22 and 23 are rejected under 35 U.S.C. 102(e) as being anticipated by You et al. (6,407,009).

A method of forming a solution film on an in process substrate by using a dropping section for dropping liquid and an in-process substrate just under said dropping section, maintaining the liquid dropped from said dropping section on said in-process substrate, and relatively moving said in-process substrate or said dropping section, wherein relative movement between said in-process substrate and said dropping section means rotating said substrate and relatively moving said dropping section from an inner periphery of said substrate toward an outer periphery of said substrate; relative movement between said in-process substrate and said dropping section means rotating said substrate and relatively moving said dropping section from an inner periphery of said substrate toward an outer periphery of said substrate for spirally dropping said liquid on said in-process substrate (Col. 9, lines 43-51); rotational

frequency w for said substrate is decreased so that a centrifugal force applied to a dropped solution film should not move said dropped solution film in accordance with relative movement of said dropping section from the inner periphery of said in-process substrate toward the outer periphery and feed rate v for said liquid from said dropping section is increased to form a solution film on said in-process substrate (Col.12, lines 1-5); wherein when said dropping section is positioned to distance r from a center of said in process substrate, feed rate v for said liquid from said dropping section is determined in accordance with rotational frequency w for said in-process substrate so that a constant value is maintained for the product of rotational frequency w and feed rate v of said substrate support; wherein relative movement of said dropping section from an inner periphery to an outer periphery is controlled to move for a specified pitch per revolution of said substrate; wherein rotational frequency w_0 is assumed for an in-process substrate when said dropping section is positioned to radius R on said in-process substrate and feed rate v_0 is assumed for said liquid when said dropping section is positioned to distance r from a center of said in-process substrate center; and when said substrate is positioned to said distance r , rotational frequency w for said substrate is determined by the product of the square root of (R/r) by w_0 and feed rate v is determined by v_0 divided by the square root of (R/r) ; wherein when said in-process substrate is a disk-shaped substrate with radius R (mm), said dropping section drops liquid at the outmost periphery of said substrate and a rotational frequency (rpm) for said substrate is smaller than the square root of $1,000,000/R$ (Col. 12, lines 32-57 and Col. 13, lines 60-65); wherein relative movement of said dropping section from the inner

periphery of said in-process substrate toward the outer periphery corresponds to the relative movement of said in-process substrate from an approximate center toward the outer periphery; wherein a region including an approximate center of said in-process substrate is used in such a manner that said dropping section moves in a column direction from one end to the other in said region including an approximate center and moves in a row direction outside said region including an approximate center based on the relative movement between said in-process substrate and said dropping section, and said dropping section supplies said in-process substrate with solution at feed rate v' to form a solution film; wherein said feed rate v is set so that it almost equals feed rate v for liquid spirally dropped just outside said region including an approximate center; wherein a region including an approximate center on said in-process substrate prevents a solution film from moving due to a centrifugal force applied to a dropped solution film by partially blocking liquid discharged from said dropping section so as not to reach said in-process substrate for droplet amount adjustment; wherein said liquid a solution containing low-dielectric material (Col. 8, line 15) ; wherein said in-process substrate with said solution film formed thereon is exposed under a pressure lower than a steam pressure at a process temperature for a solvent in said solution film, and said solvent is dried and removed to form a solid layer; wherein said in-process substrate with said solution film formed thereon is exposed to a current of air to dry and remove solvent in said solution film for forming a solid layer (Col. 27, lines 20-23); wherein said in-process substrate is a semiconductor is substrate and said solid layer is selected from at least one of an anti-reflection photosensitive film used for an exposure process, a

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low-dielectric film wherein said solid layer is a magnetic film or a light absorbent/reactive film.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 5, 6, 15 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over You et al. as applied to claims 1-4, 7-14, 16, 18, 20, 22 and 23 above, and further in view of Akram et al. (5,925,410).

You et al. does not disclose applying vibrations to the solution to form a solid layer having an almost flat surface.

Akram et al. discloses dispensing a solution in a substrate, spinning the substrate and vibrating the substrate to form a solid layer and planarizing the solid layer (Abstract and Col. 5, lines 59-64).

It would have been within the scope of one of ordinary skill in the art to combine the teachings of You et al. and Akram et al. to enable formation of the solid layer and further the vibrations eliminate voids and/or gaps in the dispensed material.

Choice of a particular disk diameter and rotational frequency would have been a matter of routine optimization. See MPEP 2144.05.

Response to Arguments

Applicant argues that You et al. fails to disclose at least relatively moving a in-process substrate or a dropping section, wherein... rotational frequency w for said substrate is decreased and feed rate v for a liquid from said dropping section is increased so that the liquid dropped from said dropping section on said in-process substrate stays at dropped position in accordance with relative movement of said dropping section from the inner periphery of said in-process substrate toward the outer periphery. However, You et al. disclose rotating the wafer at a low rate of speed, the rate of speed will depend on the viscosity of the solution and if it is thinned more easily. You et al. also disclose increasing the flow rate of the solution (Col. 12, lines 2-5) and the flow rate of solution onto the wafer can vary depending on the surface tension of the liquid and the wetting behavior of the solution on the wafer surface (Col. 11, lines 25-35).

In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within


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TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michelle Estrada whose telephone number is (703) 308-0729. The examiner can normally be reached on Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Olik Chaudhuri can be reached on 703-306-2794. The fax phone numbers for the organization where this application or proceeding is assigned are 703-308-7722 for regular communications and 703-308-7724 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.


George Fourson
Primary Examiner
Art Unit 2823


MEstrada
July 24, 2003